A CONTENT ANALYSIS OF FIRST GRADE ARITHMETIC TEXTBOOKS

A THESIS

SUBMITTED TO THE FACULTY OF ATLANTA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF ART

BY

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DEDICATION

To

My Family and Friends

For

Their Encouragement and Reassurance

L. H. S.

ACKNOWLEDGMENTS

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L. H. S.

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CHAPTER I

INTRODUCTION

Rationale

There have been many changes in most subject matter areas of the elementary school curriculum during the last ten years. Elementary school arithmetic has been one of the most important of these areas, in which change has occurred. Changes are referred to by such phrases as "new arithmetic," "modern mathematics," "the new mathematics," and the like.[1] The content within the field of mathematics has changed from emphasis on rote retention and memorization to emphasis on concepts and meaningful understanding. What number concepts should be taught in Grade 1? Why are these concepts placed in Grade 1? What are the trends in arithmetic for Grade 1? These questions should be on the minds of teachers or other personnel who are selecting arithmetic texts.

The methods for selection of textbooks vary widely in the United States. Textbooks are sometimes chosen by state

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[1]John L. Creswell, "How Effective Are Modern Mathematics Workshop?" The Arithmetic Teacher, Volume 14 (March, 1967), p. 205.

or local authorities and distributed to classrooms without any consultation of teachers. Saylor and Alexander suggest that textbooks should be chosen according to their relevancy to maximum material which help learners understand the various problems anticipated in the curriculum plan for this group; their usability in terms of the reading levels and general interests of the various members of the learning group; their accuracy of objective, scholarly presentation of facts and their interpretations; and their economy without sacrifice of the foregoing principles.[1]

The textbook has an important role in instruction. In some instances it serves as the only source of material for developing initial interest in a process; in others the textbook exercises are used as a check, verification, or extension of ideas developed in class study. The text also provide explanation, study helps, practice exercises and tests. In most classrooms the textbook is the course of study.[2]

The importance of the textbook makes it imperative that texts be selected which students can read with ease. Because of the variation in readability of different texts

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[1]J. Galen Saylor and William M. Alexander, Curriculum Planning (New York: Rinehart and Company, Inc., 1958), pp. 486-487.

[2]Herbert F. Spitzer, "Learning and Teaching Arithmetic," The Teaching of Arithmetic, Fiftieth Yearbook, Part II (Chicago: The University of Chicago Press, 1951), p. 135.

for a given grade readability scores should be used in the selection of a text. Authors and publishers of mathematics textbooks should use readability tests to assure textbooks of the proper level of reading difficulty.[1] Arithmetic texts should be easier than reading texts, perhaps one grade level easier. Ideas expressed in arithmetic texts should be expressed in short sentences and in simple, easy language.

The writer feels that competent teachers should have the freedom to select the text. However, the writer believes also that a set of criteria should be used. Also the teacher needs to keep in mind the interests, needs, and abilities of the particular group of learners involved and the general goals of the curriculum.

Evolution of the Problem

This problem grew out of the writer having served on a committee for the selection of textbooks in an elementary school. It was noted that there was not a set of criteria for the selection of textbooks and that selections were based on personal preferences. The writer believes that the critical examination and evaluation of the competing series of textbooks under consideration should be guided by carefully formulated statements setting forth the factors of quality expected of texts in this field.

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[1]Donovan A. Johnson, "The Readability of Mathematics Books," The Mathematics Teacher, Volume 50 (February, 1957), pp. 109-110.

Contribution to Educational Research

The writer hopes that the findings in this study will be useful for elementary teachers and other professional personnel who are concerned with the selection of arithmetic textbooks. It is hoped that this study will make educators aware of the need for the utilization of a comprehensive set of criteria in selecting textbooks for arithmetic at the first grade level.

Statement of the Problem

The problem involved in this study was to analyze, according to selected criteria, six selected arithmetic textbooks and to determine the extent to which these books emphasized basic concepts and activities considered fundamental to effective teaching of arithmetic.

Purpose of the Study

The major purpose of this study was to analyze six selected textbooks for the teaching of arithmetic at the first grade level used in the public schools of Georgia. More specially, the purposes of this study were:

1. To describe the physical characteristics of the selected texts.
2. To determine the extent to which the basic concepts considered fundamental to effective teaching of modern mathematics are emphasized.
3. To identify the extent to which the selected texts provide for sequential development of the major concepts.

4. To determine the extent to which the skills and activities provided in these texts meet the needs and interests of first grade pupils.

5. To present, analyze and interpret these findings in the final thesis copy according to selected criteria.

Limitation of the Study

This study was limited to a selection of six arithmetic textbooks approved by the state of Georgia for use at the first grade level.

Locale and Period of the Study

The central locale of this research was in the Trevor Arnett Library, Atlanta University, Atlanta Public Libraries, and the home of the writer, Atlanta, Georgia.

The tasks involved in the collecting, assembling, treatment of the data, and the writing of the research report were performed during the summer semester of the school year 1966-1967.

Description of Materials

Data for this research were gathered from the following sources:

1. Six selected state-adopted textbooks used in the Atlanta Public Schools.

Modern Arithmetic Through Discovery	Silver Burdett
One by One	Harcourt, Brace and World
Mathematics We Need	Ginn and Company

Seeing Through Arithmetic	Scott, Foresman and Company
Sets, Numbers Numerals	Laidlaw Brothers
Meeting Mathematics	American Book Company

2. Reference Materials

   Encyclopedias
   Dictionaries
   Instructional Manuals
   Mathematics for Georgia Schools, Volume I

3. Professional Textbooks

4. Magazines and Periodicals

Summary of Selected Criteria

The selected criteria used in evaluating the six arithmetic textbooks are summarized in the statements to follow.

1. The physical characteristics of the textbooks should include suitability in size, adequate margins, attractive covers, title and decoration, durable bindings, color and quality of paper designed for ease in reading, and the size of print and other typographical appearances sufficiently adequate for the age and grade level of the child.[1]

2. The illustrations used in the textbooks should appeal to the interest of children and be appropriate to the text.[2]

3. The style of presentation of materials must be suitable with respect to vocabulary, sentence structure, and interest level.[3]

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[1]Malcolm E. Melliott, "What to Look for in Choosing a Textbook?" National Education Journal, XXXXIV (March, 1955), 152-154.

[2]Ibid., 154-155.

[3]John A. Clement, Manual for Analyzing and Selecting Textbooks (Illinois: The Garrard Press, 1942), pp. 34-40.

4. The subject matter used should provide strong motivation, meet the needs, interests and abilities of the child and be acceptable in the light of current educational views.[1]

Method of Research

The Descriptive-Survey method of research, employing the technique of content analysis was used to gather the necessary data required to fulfill the purposes of the research.

Research Procedure

The following procedural steps were used to achieve the purposes of this research:

1. The related literature pertinent to this study was reviewed and summarized for inclusion in the thesis.
2. Copies of textbooks to be analyzed were secured from educational publishing companies.
3. An analysis sheet was prepared for recording significant data as required to fulfill the research purpose.
4. The data were assembled in appropriate tables and charts which were analyzed and interpreted as dictated by the purposes of the research.
5. The statements of findings, conclusions, implications, and recommendations were formulated and incorporated in the thesis copy.

Survey of Related Literature

The pertinent literature reviewed for this study was classified into the following areas: (1) the technique of content analysis and (2) arithmetic for the first grade.

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[1] Ibid., pp. 40-45.

Technique of content analysis.--Bernard Berelson defines content analysis as a "research technique for the objective systematic and quantitative description of the manifest content of communication."[1]

Content analysis was first used by students of journalism and later by sociologists to study the content of American newspapers. Berelson noted that the techniques involving content analysis have been applied more in recent years and that the output has increased sharply in every five year interval over the past thirty years.[2]

Content analysis may deal with the collection and classification of factual data from the official reports of institutions or it may classify and evaluate the contents of documents according to set criteria.[3]

Best states that, "content or document analysis should serve a useful purpose in research, adding important knowledge to a field of study, or yielding information that is helpful in evaluating and improving social or educational practices."[4]

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[1]Bernard Berelson, Content Analysis in Communication Research (Illinois: The Free Press Publishers, 1952), p. 18.

[2]Ibid., p. 21.

[3]John Best, Research in Education (Englewood Cliff, New Jersey: Prentice Hall, Inc., 1959), pp. 117-118.

[4]Ibid., p. 120.

Content analysis is valuable to education in the derivation and revision of the curriculum and in the understanding of some of the complex variables encountered. Although analysis is concerned with the present status, it is definitely oriented toward the improvement of future practice.[1]

Seventeen types of uses of content analysis or documentary analysis have been identified. These seventeen types have been grouped under substance, form, producers of content, audience of content and effects of content.[2]

Textbooks can be analyzed from the standpoint of any number of aspects. Smith analyzed arithmetic textbooks written since the early 1800's from the standpoint of content methods, and problems. The period of the analyses was from 1790 to 1940 which was divided into five periods of thirty years each, and the books selected from each period were analyzed in the same manner. This was done so that information from each period could be studied in its relationship to the information from books of any of the other four periods.[3]

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[1]George J. Mouly, The Science of Educational Research (New York: American Book Company, 1963), pp. 282-283.

[2]Carter V. Good, Introduction to Educational Research (New York: Appleton-Century-Crofts, Inc., 1959), pp. 249-250.

[3]Henry L. Smith and M. T. Eaton, "Analysis of Arithmetic Textbooks, 1911-1940," One Hundred and Fifty Years of Arithmetic Textbooks, School of Education Bulletin, 21: No. 1 (Bloomington: Indiana University, 1945), pp. 5, 49.

Cook used the technique of content analysis to determine the treatment given the Negro in several selected history textbooks. Cook analyzed these texts in terms of pagination, pictorial representation, comprehension and biases during the period of American History. The periods studied were (1) American Revolution (2) Institution of Slavery (3) Civil War (4) Period of Reconstruction and (5) Reconstruction to 1960.[1]

Jacobs made an analytical and comparative study of educational journals. She was interested in variety, quality, subjects treated and the format of the journals.[2]

In Harris analysis of ten educational administration textbooks used in the training of administrators, he used the technique of content analysis to identify concepts and theories. He proposed to determine the extent to which they provide latitude for opportunity for training of administrators.[3]

Arithmetic for first grade.--Arithmetic is one of the most important elements of our social heritage. Number

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[1]Sylvia F. Cook, "A Treatment of the Negro in History Books" (unpublished Master's thesis, School of Education, Atlanta University, 1964).

[2]Margaret A. Jacobs, "A Content Analysis of Three Educational Journals" (unpublished Master's thesis, School of Education, Atlanta University, 1962).

[3]Jimmie Edward Harris, "Content Analysis of Ten Educational Administration Textbooks" (unpublished Master's thesis, School of Education, Atlanta University, 1964).

enables man to deal effectively with quantitative aspects of his environment.[1] Without numbers a wide variety of cooperative activities that characterize modern life could not have been developed.

Arithmetic must be realistic and functional. The arithmetic curriculum should include a wide variety of selected learning experiences in which number functions directly. The more closely the work in arithmetic is integrated with its practical applications in the affairs of life, the more productive the experiences will be. The program should consist of rich, vital, systematic, well-integrated experiences that are adapted to the needs, interests, aptitude, and stage of maturity of the children.[2] Arithmetic should be taught in terms of meanings, understandings and generalizations.

Since the 1930's there has been an increasing recognition and acceptance of the idea that arithmetic ideas should be meaningful to boys and girls. This belief lead to a statement of objective by Hartung:

> The pupil should understand the things they are expected to learn. Closely related to this is the fact that, if arithmetic is understood, it is better liked as a school subject. This, in turn, results in better motivation for more learning and so has a

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[1] Foster E. Grossnickle and Leo J. Brueckner, Discovering Meanings in Arithmetic (New York: Holt Rinehart and Winston, 1959), pp. 2-4.

[2] Ibid., p. 4.

> cumulatives effect. Moreover, material that is understood is retained better by the children.[1]

The content in first grade should include: (1) numeration, (2) fundamental operations with whole numbers, (3) fundamental operations with fractions, (4) relations, (5) measurement, (6) geometry, (7) charts and graphs and (8) problem solving.[2] Each of these topics will be discussed briefly in the paragraphs that follows.

The concept of the base-ten numeration is important because arithmetic is fundamentally a system of ideas about natural numbers. All of the natural numbers may be written by using only ten digits and the idea of place value. The base-ten system enables the child to learn a systematic way to name the natural numbers. Computational procedures depend to a very large extent upon the base-ten system of numeration. A careful development of the numeration system through 99 should be provided in the first grade. Numeration systems with bases other than ten should not be included in the first grade. It is believed that the study of other bases may confuse some children.[3]

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[1]Maurice L. Hartung, et. al. Seeing Through Arithmetic (Atlanta: Scott, Foresman and Company, 1964), pp. 7-8.

[2]State Department of Education, Mathematics for Georgia Schools, Volume I (Atlanta: State Department of Education, 1962), pp. 14-22.

[3]Hartung, op. cit., pp. 7-8.

The fundamental operations with whole numbers include addition, subtraction, multiplication and division. Addition is the first of the computational processes to be taught to children. Addition is the process of combining two or more numbers to make another number. Children learn to add by counting, counting on and by completing tens. Learning the addition basic facts is still an essential part of the arithmetic.[1]

Subtraction serves three computational needs, finding the remainder, finding the difference and finding the missing addend. The basic subtraction facts are identical to those used in addition, but stated inversely. These facts are presented at or near the time the addition facts are being learned, and they may be more meaningful if they are presented in their inverse relationship to the addition facts.[2] It is desirable at the outset to have the subtrahend and the difference not exceed 4, in teaching the subtraction basic facts.

Although zero as a number is taught, zero addition or subtraction basic facts are not introduced in the first grade. As a cardinal number zero is associated with the set that has no objects, and such sums as 2+0 are introduced

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[1]Clyde G. Corle, Teaching Mathematics in the Elementary School (New York: The Ronald Press Company, 1964), p. 113.

[2]Ibid., p. 129.

to complete the system rather than for other practical reasons.[1]

Multiplication is a process of repeated addition. Children at the first grade level should understand that multiplication means putting together groups of equal size. They should have experiences in regrouping and counting on by twos and threes to form other groups.[2]

Division of whole numbers is an inverse process of multiplication. Children should understand that division requires us to separate a number into a stated number of equalized groups.[3]

Children have already acquired some knowledge of fractions before they enter the first grade. Children have need for concepts of fractions in their everyday school life. These needs arise from natural situations in the classroom.[4]

Fundamental operations with fractions for the first grade include common fractions and decimals. Most children will acquire some knowledge of unit fractions. A unit fraction has a numeration of one, as 1/2 or 1/4. The pupil must understand the meaning of a whole before he

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[1]State Department of Education, op. cit., p. 18.

[2]Corle, op. cit., p. 161.

[3]Hartung, op. cit., p. 10.

[4]William B. Ragan, Modern Elementary Curriculum (New York: The Dryden Press, 1956), p. 346.

can understand the mathematical meaning of a fraction. The object used to represent a fractional part of a whole is an important factor to be considered in helping pupils recognize a fraction. The teacher should use objects, such as apples and oranges.[1] It is not expected that this instruction will develop complete understandings, but it will provide a rich background for the systematic study of fractions.

Relations of equivalence and inequalities should be understood in the first grade. Understanding of equivalence has been built into the entire program with attention given to mathematical sentences.[2]

In order to make concepts of measurement more meaningful and precise, children should be given experiences in which they learn about more of the rudimentary devices. They should have practice in applying units of measure.[3] The following items are suggested by the State Department of Education:

1. Linear
   Use inch, foot, yard
2. Liquid
   Discover cup, pint, quart
3. Weight
   Use pound

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[1]Grossnickle and Brueckner, op. cit., p. 125.

[2]State Department of Education, op. cit., p. 19.

[3]Grossnickle and Brueckner, op. cit., p. 122.

4. Time
   Understand hour and half-hour; name, number, and read days of week, month of year and seasons

5. Money
   Understand relative value of one cent, five cents, ten cents, and twenty-five cents

6, Quantity
   Understand pair, dozen, half-dozen and tablespoon

7. Temperature
   Explore thermometer

Geometric concepts are introduced to children in the first grade. They should explore the following shapes: line, circle, square, triangle, rectangle and cube. The different shapes provide a way of helping the children respond to the printed page at a time when they have not yet learned to read.[1]

Charts and graphs can be used advantageously to enrich mathematics. Children can find many uses for charts and graphs in everyday activities around the school.[2]

Problem solving skills are the most significant part of arithmetic instruction. Solving the verbal problems from day to day is probably the most important reason for children to develop an understanding of numbers.

Many children solve verbal problems long before they start to school. Early school experiences bring increased

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[1]Hartung, op. cit., p. 6.

[2]Corle, op. cit., p. 294.

opportunities for verbal problems, because the school day seems filled with new uses for quantitative ideas. First graders must carry money to school to pay for lunch, for milk and for pictures.

A classroom should provide children with continuous problem solving opportunities. The approach to problem solving is a significant factor in developing the skill in children. The classroom's housekeeping chores are filled with problem solving situations. Drawings often use quantities, and the children enjoy telling and hearing about these drawings. Charts of daily activities, special events or number lessons can make numbers functional and improve the pupils' vocabulary. Problems presented to children must be realistic in both content and application. Too much semi-concrete material and abstract number recall must be avoided, at least until understanding has been established.[1]

Summary of Related Literature

The review of related literature made distinct contributions to the study. The literature revealed that:

1. Content analysis is a research technique for the objective systematic and quantitative description of the manifest content of communication.
2. Content analysis may deal with the collection and classification of factual data from the

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[1] Ibid., pp. 327, 353.

official reports of institutions or it may classify and evaluate the contents of documents according to set criteria.

3. Content analysis is available to education in the derivation and revision of the curriculum and in the understanding of some of the complex variables encountered.

4. Textbooks can be analyzed from the standpoint of any number of aspects.

5. The content in the first grade should include numeration, fundamental operations with whole numbers, fundamental operations with fractions, relations, measurement, geometry, chart and graphs and problem solving.

6. The concept of the base-ten is important because arithmetic is fundamentally a system of ideas about natural numbers.

7. The fundamental operations with whole numbers include addition, subtraction, multiplication and division.

8. Addition is the first of the computational processes to be taught to children.

9. Addition is the process of combining two or more numbers to make another number.

10. Subtraction serves three computational needs, finding the remainder, finding the difference and finding the missing addend.

11. Multiplication is a process of repeated addition, and division of whole numbers is an inverse process of multiplication.

12. Fundamental operations with fractions for the first grade include common fractions and decimals.

13. Problems presented to children must be realistic in both content and application. Too much semi-concrete material and abstract number recall must be avoided, at least until understanding has been established.

CHAPTER II

PRESENTATION, ANALYSIS AND INTERPRETATION OF THE DATA

The presentation, analysis and interpretation of the data obtained by analysis of the six selected textbooks has been organized and is presented as follows: (a) identification of the textbooks; (b) procedure utilized in treatment of the data; and (c) the presentation, analysis, and interpretation of the data derived from the research.

Identification of the Selected Textbooks

The textbooks used in this study were selected from the State approved list of textbooks adopted by the Georgia State Board of Education. The six textbooks used in the research are listed below. See Appendix A for the names of publishers and the locations of publications for the specified textbooks.

Modern Arithmetic Through Discovery	Robert L. Morton Merle Gray Myron F. Rosskopf
One by One	Caroline H. Clark Leslie S. Beatty Joseph N. Payne George A. Spooner

Mathematics We Need	William A. Brownell J. Fred Weaver
Seeing Through Arithmetic	Maurice L. Hartung Henry Van Engen E. Glenadine Gibb James E. Stochl Lois Knowles Ray Walch
Sets. Numbers Numerals	Bernard H. Gundlack Ronald C. Welch Edward G. Buffie
Meeting Mathematics	Edwina Deans Robert B. Kane Robert A. Oesterle

Modern Arithmetic Through Discovery (Morton and Others).--The program presented in this text is designed to provide an introduction to fundamental concepts of number, the operations of addition and subtraction, the use of number sentences to summarize problem situations, and elementary experiences with measurement and geometry. Throughout the book the activities are designed to enlist the child's participation; to encourage the child to look for and discover patterns in his arithmetic experiences; and to present arithmetic concepts based upon activities in a sequence pattern.

The text was written by Robert Lee Morton, Merle Gray, and Myron F. Ross.

One by One (Clark and Others).--This text is designed to provide learning experiences through an inquiry-discovery-conclusion approach. The major features of this text are:

1. Illustrative materials in full color are placed throughout the text to develop concepts pictorially

through situations familar to pupils.

2. Special emphasis is given to the development of problem solving ability as it relates to applications and to word problems.

3. The number line and counting charts are placed at the front of the pupils's book.

One by One was written by Caroline H. Clark, Leslie S. Beatty, Joseph N. Payne, and George A. Spooner.

Mathematics We Need (Brownell and Weaver).--This text places stress on a realistic developmental program. The program takes into account the development of young children, both mathematically and psychologically.

The content developed in Mathematics We Need emphasizes concepts and understandings associated with number operations, with numeration and with geometry. The skills developed in this text are both computational and non-computational. The applications emphasized relate both to mathematics itself and to the child's in-school and out-of-school environment.

Several stages of instruction are evidenced in the development of all facets of the program in this text. The first stage is introduction and exploration. The second stage is one of growth and progress toward greater mathematical maturity. A third stage is that of reinforcement and extension of learning. Finally, the concept of a whole number is extended to include the association of a whole number with a point on a line.

Seeing Through Arithmetic (Hartung and Others).--The

content of Seeing Through Arithmetic includes ideas from geometry, the cardinal idea of number, the ordinal use of number, numeration, money, fundamental operations, basic facts, and measurement. The major features of this text are:

1. It is designed to give children experience with many examples that differ widely in nonessential concrete features.
2. Basic facts of problem solving are introduced pictorially.
3. It is designed to use the discovery method.
4. Extension section is included to meet individual need.
5. The content is developed to provide a complete developmental and reteaching pattern.

Sets. Numbers Numerals (Gundlach and Others).--This text provides a continuous flow of concept-building experiences beginning with sets, proceeding to numbers and numerals, and then to operations on numbers. This text also provides each pupil with Counting Men and Number Strip materials at the back of his book for concrete manipulative aids to concept - building and problem solving.

The title and printed directions of each lesson page implicitly states the purpose of the lesson and informs the teacher and the parent what is to be achieved in the lesson. The directions are designed to stimulate the pupil to increase his reading ability.

The concept - building lessons begins with drawings which suggest pupil participation, either with real objects

or with manipulative aids. The pages include already learned facts, explanatory drawings and a variety of manipulative aids. Each unit concludes with a self-evaluation page entitled "Checkup Time." Finally, Sets. Numbers Numerals provides a checklist of mathematical concepts and skills to be learned in grade one entitled "My Arithmetic Record."

Meeting Mathematics (Deans and Others).--This text is based upon a psychological foundation which emphasized the perceiving of relationships, the awareness of the relationships of the parts to the whole. The text has extensive exercises to provide practice, to stimulate discovery, and to open new frontiers in mathematics.

The content developed in Meeting Mathematics emphasizes concepts and understanding associated with the number systems, relationships, mathematical ideas, sets, organization of facts, review, problem solving and discovery as a means of learning.

The text also has special lessons. Special lessons include review, tests, practice pages and enrichment. The review lessons are placed for checking pupils' understanding of new work as well as the retention of earlier learnings. The tests are placed to test mastery of number facts. Throughout the text practice pages are spaced to be of maximum benefit. The enrichment lessons are placed at the end of each chapter.

Procedure Utilized in the Treatment of Data

The score card used in this study was constructed on the basis of the subject matter content which the Mathematics for Georgia Schools proposes for the first grade, specific features deemed most important in the opinions of authorities, and the accepted criteria in the area of textbook selection. In addition, the score card was designed to identify the extent of emphasis placed upon specific features as outlined in the purposes of this research. Each item was rated on a scale from "4" to "0" with "4" representing the highest rank. The relative quality of special features was indicated according to this code:

"4" means "Meets the criteria in excess of those of the State guide

"3" means "Present at an excellent level"

"2" means "Present to a great extent"

"1" means "Present to some extent"

"0" means "No clear evidence"

Physical Characteristics of the Textbooks

The physical features of the arithmetic textbooks analyzed were found to be important factors to consider in determining the selection, especially in situations in which the book must survive several years of use. Children instinctively select books with bright and colorful covers. The general typographical appearance

of a textbook is the most important single feature of the physical makeup of a textbook and should be critically appraised. Colorful and attractive illustrations throughout the book add to the interest of the material and serve as an excellent motivating device.

Table 1, page 26, indicates a distribution of ratings according to the characteristics of the six selected arithmetic textbooks. The table shows that all of the features were present in five of the six textbooks. Five of the six textbooks rated "at an excellent level" in regard to covers. They are as follows: Modern Arithmetic Through Discovery, One by One, Mathematics We Need, Sets. Numbers Numerals, and Meeting Mathematics. Seeing Through Arithmetic was the only text with a dull cover. The print was found to be large and very easy to read. All of the books rated "at excellent level" on this point. The pictures and illustrations also rated "excellent" in all of the textbooks. With regard to the entire makeup all of the texts rated very high.

Subject Matter Content

For a textbook to function as a useful instructional guide, its subject matter must not only be suited to the interest and abilities of pupils, but must also be acceptable in the light of the current educational point-of-view.

The place of the arithmetic in the total curriculum

TABLE 1

DISTRIBUTION OF RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE PHYSICAL CHARACTERISTICS

Physical Characteristics	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets. Numbers Numerals	Meeting Mathematics
Is the cover of the book attractive?	3	3	3	0	3	3
Is the print easy to read?	3	3	3	3	3	3
Is the type size adapted to grade level?	3	3	3	3	3	3
Are the pages designed for ease of teaching?	3	3	3	3	3	3
Are the pictures attractive?	3	3	3	3	3	3
Are the illustrations suitable to the grade level?	3	3	3	3	3	3

is affected somewhat by differences in the curriculum pattern of different schools. The subject curriculums, which are by far the most frequent and widespread, vary from those which follow rather closely the textbooks in arithmetic to those which, although following the subject divisions in a broad way, place the emphasis on problems and activities.

Regardless of the curriculum pattern, it is entirely feasible to determine, for each field in the curriculum and at each grade level what mathematical concepts and abilities are most frequently and crucially needed. Also a systematic course in arithmetic is needed to sensitize both teachers and pupils to the mathematical elements in problems in other fields and to give pupils the confidence, resourcefulness, and competence needed to deal with these elements as they are confronted. Mathematics for Georgia Schools states that the content in the first grade should include the following:

1. Numeration
2. Fundamental Operations With Whole Numbers
3. Fundamental Operations With Fractions
4. Relations
5. Measurement
6. Geometry
7. Charts and Graphs
8. Problem Solving

The findings according to the content are found in the section to follow.

Table 2, page 29, presents a distribution of the qualitative ratings according to basic concepts emphasized on numeration in the six arithmetic textbooks. The table indicated that all of the concepts were obviously present in three of the texts. They are as follows: One by One, Mathematics We Need, and Meeting Mathematics. Seeing Through Arithmetic and Sets. Number Numerals showed "no clear evidence" of the concept of even and odd numbers. Modern Arithmetic Through Discovery showed "no clear evidence" of the concepts of ordinals through tenth.

The quantitative data on the treatment of numeration in the six textbooks is found in Appendix B. The number of pages devoted to numeration ranged from a low of 84 in Sets. Number Numerals to a high of 156 in One by One. The others ranged as follows: Meeting Mathematics 133, Mathematics We Need 113, Modern Arithmetic Through Discovery 101 and Seeing Through Arithmetic 93.

Table 3, page 31, presents a distribution of the qualitative ratings according to the basic concepts emphasized on fundamental operations with whole numbers. This table indicated that the texts rated from 4-0, with "4" representing the highest rating, and "0" representing "no clear evidence." The six textbooks rated "at an excellent level" on combining and separating groups

TABLE 2

DISTRIBUTION OF RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE CONCEPTS OF NUMERATION

Numeration	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets. Numbers Numerals	Meeting Mathematics
Reading and writing to 99	3	3	3	3	3	3
Ordinals through tenth	0	3	2	3	2	3
Sets	3	3	3	3	3	3
One to one matching	2	2	3	3	3	3
Understand more than, greater than, and others	2	3	3	3	2	3
Place-value	3	3	2	2	1	3
Even and odd numbers	1	1	1	0	0	1

through ten. In addition, all of the texts contained addition and subtraction facts beyond the suggested content in the Mathematics for Georgia Schools and therefore rated at "4". The commutative property of addition rated at "3" in the six textbooks. The use of the number line received ratings from 3-0. One by One was the only textbook with a rating of "3". Each of the texts Modern Arithmetic Through Discovery, Mathematics We Need and Sets. Numbers Numerals rated at "1". Seeing Through Arithmetic received a rating of "0". Symbols rated from 3-0. One by One and Meeting Mathematics were the only two textbooks that showed "some evidence" of multiplication and division facts.

See Appendix B for the quantitative ratings according to the fundamental operations with whole numbers. The table shows that the total number of pages devoted to fundamental operations with whole numbers ranged from a low of 54 in Sets. Numbers Numerals to a high of 89 in Modern Arithmetic Through Discovery. The number of pages devoted to these features in the remaining arithmetic texts ranked as follows: 60 for Seeing Through Arithmetic, 71 for Mathematics We Need and 75 for One by One and Meeting Mathematics.

Table 4 indicates a distribution of ratings according to the basic concepts of fundamental operations with fractions. The table shows that the ratings ranged

TABLE 3

DISTRIBUTION OF RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO BASIC CONCEPTS OF FUNDAMENTAL OPERATIONS WITH WHOLE NUMBERS

Fundamental Operations With Whole Numbers	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets. Numbers Numerals	Meeting Mathematics
Combine and separate groups through ten	3	3	3	3	3	3
Combine and separate groups beyond ten	4	4	4	4	4	4
Understand the symbols (+, =, -)	1	2	0	3	0	1
Use number line for adding and subtracting	1	3	1	0	1	0
Understand that multiplication means putting together groups of equal size	0	1	0	0	0	1
Division means separating a whole group	0	1	0	0	0	1

from 3-0. Modern Arithmetic Through Discovery, One by One, and Sets. Numbers Numerals each rated "excellent" on the concepts of common fractions and showed "no clear evidence" of the concepts of decimals. Meeting Mathematics received a rating of "1" on common fractions and showed "no clear evidence" of decimals. Mathematics We Need and Seeing Through Arithmetic showed "no clear evidence" of common fractions and decimals. Although none of the texts showed "no clear evidence" of decimals in money, but all of the texts dealt with the cent symbol in money.

TABLE 4

DISTRIBUTION OF RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE CONCEPTS OF FUNDAMENTAL OPERATIONS WITH FRACTIONS

Textbooks	Common Fractions	Decimals
Modern Arithmetic Through Discovery	3	0
One by One	3	0
Mathematics We Need	0	0
Seeing Through Arithmetic	0	0
Sets. Numbers Numerals	3	0
Meeting Mathematics	1	0

The quantitative ratings according to the fundamental operations with fractions are found in Appendix B. The table shows that the total number of pages devoted to fundamental operations with fractions ranged from a low of 0 in both Mathematics We Need and Seeing Through Arithmetic to a high of 8 in One by One. The number of pages devoted to these features in the remaining arithmetic texts ranked as follows: Modern Arithmetic Through Discovery 6, Sets . Numbers Numerals 5 and Meeting Mathematics 2.

Table 5, page 35, presents a distribution of ratings of the arithmetic textbooks according to the concepts of measurement. The table shows that the texts rated from 3-0. One by One received a rating of "3" on linear measures and the remaining five rated as follows: Modern Arithmetic Through Discovery, Seeing Through Arithmetic and Sets . Numbers Numerals each rated at "2". These three texts showed linear measures to a "great extent". Mathematics We Need and Meeting Mathematics showed to "some extent" the concepts of linear measures. Five of the six texts showed "no clear evidence" of weight. Mathematics We Need was the only text that showed concepts of weight to "some extent". Time received ratings from 2-0. One by One showed the concepts of time to a "great extent". In addition, it is the only text to show "some extent" of the concepts of days of the week. Modern Arithmetic Through Discovery, Mathematics We Need

Sets . Numbers Numerals and Meeting Mathematics each rated a "1". Seeing Through Arithmetic rated at "0". The concepts of money received ratings from 3-1. One by One and Seeing Through Arithmetic each rated "at an excellent level". Modern Arithmetic Through Discovery, Mathematics We Need and Sets . Numbers Numerals received ratings of "1". Each text received a rating of "0" on the concepts of quantity. They showed "no clear evidence" of the concepts. The texts rated from 1-0 on the concepts of temperature. Four of the texts rated at "0". They are as follows: Modern Arithmetic Through Discovery, One by One, Seeing Through Arithmetic and Sets . Numbers Numerals. Mathematics We Need and Meeting Mathematics each rated at "1".

The total number of pages ranged from a low of 12 in Sets . Numbers Numerals to a high of 40 in One by One. The remaining ranged as follows: 17 for Modern Arithmetic Through Discovery and Mathematics We Need, 20 for Seeing Through Arithmetic and 21 for Meeting Mathematics. See Appendix B for the total number of pages devoted to each concept.

Table 6, page 37, presents a distribution of ratings of the arithmetic textbooks according to the concepts of geometry. The table shows that all of the features were obviously present in five of the six textbooks. The five texts are as follows: Modern Arithmetic Through Discovery, One by One, Mathematics We Need, Seeing

TABLE 5

DISTRIBUTION OF RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE CONCEPTS OF MEASUREMENT

Measurement	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets . Numbers Numerals	Meeting Mathematics
Linear (inch, foot yard)	2	3	2	2	2	1
Liquid (cup, pint and quart)	1	1	1	1	1	1
Weight (pound)	0	0	1	0	0	0
Time (hour, half hour, days of week, months and seasons)	1	2	1	0	1	1
Money (coins)	1	3	1	3	1	2
Quantity (pair, dozen, tablespoon)	0	0	0	0	0	0
Temperature	0	0	1	0	0	1

Through Arithmetic and Sets. Numbers Numerals. Meeting Mathematics showed "no clear evidence" of the concepts of geometry.

See Appendix B for the total number of pages devoted to each book. The table indicates that Seeing Through Arithmetic had a total of 37 pages devoted to geometry. The remaining five ranged as follows: 34 for Sets. Numbers Numerals, 28 for Modern Arithmetic Through Discovery, 26 for One by One and 0 for Meeting Mathematics.

Table 7, page 38, presents a distribution of ratings of the arithmetic textbooks according to the concepts of problem solving. The table shows that all of the features are present in all of the books. The ratings ranged from 3-2. Four of the texts received ratings "at an excellent level". The remaining two received ratings of "2", which means that the concepts were mentioned to a "great extent".

See Appendix B for the total number of pages devoted to each concept. The table shows that the total number of pages ranged from a low of 22 in Sets. Numbers Numerals to a high of 66 in Seeing Through Arithmetic. The others ranked as follows: Modern Arithmetic Through Discovery 55, One by One and Meeting Mathematics 45, and Mathematics We Need 34.

TABLE 6

DISTRIBUTION OF RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE CONCEPTS OF GEOMETRY

Geometry	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets. Numbers Numerals	Meeting Mathematics
1. Square	3	3	3	3	3	0
2. Triangle	3	3	3	3	3	0
3. Rectangle	3	3	3	3	3	0
4. Line	3	3	3	3	3	0
5. Circle	3	3	3	3	3	0

TABLE 7

DISTRIBUTION OF RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE CONCEPTS OF PROBLEM SOLVING

Problem Solving	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets. Numbers Numerals	Meeting Mathematics
Through oral expression formulate creative story problems	3	3	3	2	3	2
Solve oral and written problems involving the mathematical operations	3	3	2	3	2	3

Sequential Development

Children gain many concepts of number incidentally. But these concepts are usually crude and not very well interrelated. The purpose of instruction is to guide children from these crude concepts to more precise ways of thinking and of expressing quantitative ideas. It is necessary, therefore, that the arithmetic textbook be organized systematically.

Arithmetic learning is a developmental process. When a child needs to know how many objects he has, he counts them. After learning the number of objects in the group he gains additional concepts by comparing the size of the group with that of another group, taking the group apart, and putting new groups together. Step by step he develops the concepts necessary to enable him to perform the computational skills and to refine his thinking. Since arithmetic is logical in nature, it is learned through a systematic and logically organized program.

Table 8, page 40, presents a distribution of ratings according to the sequential development of the six selected arithmetic textbooks. The table shows that all of the features were present in the six textbooks. However, the features were present at various levels.

Types of Activities

The value of the basic concepts in the arithmetic

TABLE 8

DISTRIBUTION OF RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE SEQUENTIAL DEVELOPMENT

Sequential Development	Modern Arithmetic Through Discovery		One by One		Mathematics We Need		Seeing Through Arithmetic		Sets . Numbers Numerals		Meeting Mathematics	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Does the text provide for a systematic review?	X		X		X		X		X		X	
Does the text provide for correlation of the various branches of arithmetic?	X		X		X		X		X		X	
Does the text provide for simultaneously teaching of arithmetic?	X		X		X		X		X		X	
Are the elements of increasing complexity introduced in spiral fashions?	X		X		X		X		X		X	

textbook is determined to a degree by the types of activities. Activities to build readiness and activities for initial learning would perhaps enhance arithmetic growth. The activities should be those that arise naturally and incidentally in connection with the classroom environment and those which are specifically designed to relate to the objectives of the content. To cope with the problem of individual differences, there must be a wide variety of activities provided within the basic mathematics program.

Table 9, page 42, presents the distributions of ratings according to types of activities found in the six selected arithmetic textbooks. The table shows that five of the six texts rated "at an excellent level" on all of the activities. Mathematics We Need showed "no clear evidence" of activities for individual teaching.

TABLE 9

DISTRIBUTION OF RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE TYPES OF ACTIVITIES

Types of Activities	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets. Numbers Numerals	Meeting Mathematics
To build readiness	3	3	3	3	3	3
For individual reteaching	3	3	3	3	3	3
To precede lesson	3	3	3	3	3	3
Real activities	3	3	3	3	3	3
Variety to insure interests	3	3	3	3	3	3
Provisions for measuring progress in oral and written expressions	3	3	3	3	3	3
Activities for remedial instructional materials	3	3	3	3	3	3
Enrichment materials for rapid learners	3	3	3	3	3	3

CHAPTER III

SUMMARY AND CONCLUSIONS

Background and Basic Design of the Study

Arithmetic is the foundation of all branches of mathematics. It is one of the most important elements of our social heritage. Number is the basic element in a constantly expanding system of thinking which enables man to deal effectively with quantitative aspects of his environment. Without number, a variety of cooperative activities that characterize modern life could not have been developed.

The modern arithmetic curriculum includes a wide variety of carefully selected learning experiences in which number functions directly. The more closely the work in arithmetic is integrated with its practical applications in the affairs of life, the more productive the experiences will be. The arithmetic program should consist of rich, vital, systematic, well-integrated experiences that are adapted to the needs, interests, aptitude, and stage of maturity of the children. Therefore, it is imperative that arithmetic textbooks be selected with careful consideration.

Teachers and supervisors confronted with the problem of selecting an elementary school arithmetic textbook must gather exact information on the specific factors which determine the quality of textbooks. The critical examination and evaluation of the competing series of textbooks under consideration should be guided by carefully formulated statements setting forth the factors of quality expected of texts in this field. The score card provides a reasonable guarantee that important elements of quality will be neither overlooked nor given weighing out of line with their relative importance. Authors are convinced that a textbook score card can render a distinct and highly valuable service in a textbook adoption program. However, the quality of the service will depend upon the training the examiners are given in the use of the score card, and the conscientious care with which they apply their training in the analysis and evaluation of the textbooks they are asked to examine.

The problem involved in this study was to analyze, according to selected criteria, six selected arithmetic textbooks and to determine the extent to which these books emphasized basic concepts and activities considered fundamental to effective teaching of arithmetic.

The major purposes of this research were to analyze six first grade arithmetic textbooks in terms of:

a. physical characteristics

b. concepts emphasized

c. the extent to which the selected texts provided for sequential development of the basic concepts

d. types of suggested activities

This research was limited to a selection of six arithmetic textbooks approved by the State of Georgia for use at the first grade level.

The central locale of this research was in the Trevor Arnett Library, Atlanta University, Atlanta Public Libraries, and the home of the writer, Atlanta, Georgia.

The materials used were gathered from the following sources:

1. Professional Textbooks
2. Magazines and Periodicals
3. Reference Materials

   Dictionaries
   Instructional Manuals
   Mathematics for Georgia Schools, Volume I

4. Set of criteria designed to evaluate the selected textbooks

The Descriptive-Survey method of research, employing the technique of content analysis was used to gather the necessary data required to fulfill the purposes of this research.

The procedures used in conducting this research were:

1. The related literature pertinent to this study was reviewed and summarized for inclusion in the thesis.

2. Copies of the textbooks to be analyzed were secured from educational publishing companies.

3. An analysis sheet was prepared for recording significant data as required to fulfill the research purposes.

4. The data was assembled in appropriate tables and was analyzed as dictated by the purposes of the research.

5. Findings, conclusions, implications, and recommendations were made and included in the final thesis copy.

Summary of Related Literature

The review of related literature made distinct contributions to the study. The literature revealed that:

1. Content analysis is a research technique for the objective systematic and quantitative description of the manifest content of communication.

2. Content analysis may deal with the collection and classification of factual data from the official reports of institutions or it may classify and evaluate the contents of documents according to set criteria.

3. Content analysis is valuable to education in the derivation and revision of the curriculum and in the understanding of some of the complex variables encountered.

4. Textbooks can be analyzed from the standpoint of any number of aspects.

5. The content in the first grade should include numeration, fundamental operations with whole numbers, fundamental operations with fractions, relations, measurement, geometry, charts and graphs and problem solving.

6. The concept of the base-ten is important because arithmetic is fundamentally a system of ideas about natural numbers.

7. The fundamental operations with whole numbers include addition, subtraction, multiplication and division.

8. Addition is the first of the computational processes to be taught to children.

9. Addition is the process of combining two or more numbers to make another number.

10. Subtraction serves three computational needs, finding the remainder, finding the difference, and finding the missing addend.

11. Multiplication is a process of repeated addition, and division of whole numbers is an inverse process of multiplication.

12. Fundamental operations with fractions for the first grade include common fractions and decimals.

13. Problems presented to children must be realistic in both content and application. Too much semi-concrete material and abstract number recall must be avoided, at least until understanding has been established.

Summary of Basic Findings

The significant findings as revealed in the content of this research are stated below:

1. Five of the six texts contained all of the features related to the physical characteristics. They were: Modern Arithmetic Through Discovery, One by One, Mathematics We Need, Sets. Numbers Numerals, and Meeting Mathematics. The features found were: (1) attractive covers; (2) large print; (3) attractive pictures and illustrations; and (4) pages uncrowded and designed for ease of teaching. Seeing Through Arithmetic showed "no clear evidence" of an attractive cover, however, it did show the remaining features.

2. According to the concepts of numeration all the features were present in three of the texts. They were: One by One, Mathematics We Need, and Meeting Mathematics. The concepts found were: (1) reading and writing to 99; (2) ordinals through tenth; (3) sets (groups) to 10 and members of a set; (4) one to one matching; (5) vocabulary extended to understanding of more than, greater than, less than and others;

(6) place-value of ones, tens; and (7) distinguishing between even and odd numbers. Seeing Through Arithmetic and Sets . Numbers Numerals showed "no clear evidence" of the concepts of even and odd numbers. Modern Arithmetic Through Discovery showed "no clear evidence" of the concepts of ordinals through tenth. The six books used from 84 to 156 pages to treat numeration.

3. The six textbooks rated "at an excellent level" on combining and separating groups through ten. All the texts contained addition and subtraction facts beyond the suggested content in the Mathematics for Georgia Schools. One by One and Meeting Mathematics were the only two textbooks that showed to "some extent" the concepts of multiplication and division facts. The number of pages devoted to fundamental operations with whole numbers ranged from 54 to 89.

4. All of the textbooks showed to "some extent" the concepts of common fractions, but showed "no clear evidence" of decimals. The fractions found in these texts were: 1/4, 1/2, and 1/3. The books used the operation of addition with the common fractions.

5. The six texts showed the concepts of measurement at various level. One by One rated "at an excellent level" on linear measures. Three of the remaining five showed linear measures to a "great extent". They are as follows: Modern Arithmetic Through Discovery, Seeing Through Arithmetic and Sets . Numbers Numerals. Mathematics We Need and Meeting Mathematics showed to "some extent" the concept of linear measures. Mathematics We Need was the only text that showed the concepts of weight to "some extent".

6. Five of the texts contained all of the features related to the concepts of geometry. Meeting Mathematics showed "no clear evidence" of the concepts of geometry.

7. All of the texts contained problem solving.

8. All of the features according to sequential development and types of activities were present in the six texts.

Conclusion

The conclusions of this study were specific answers to the purposes of this study. These conclusions were based upon the data collected and interpreted in the present study.

1. The six arithmetic textbooks studied gave evidence that authors and publishers placed emphasis on the attractiveness of the books, use of activities and illustrations to enhance instructional procedures, and typographical signals designed to encourage students' independence.

2. All of the books were written within the last three years, making them "new" enough to include up-to-date materials necessary to keep children abreast of recent trends in new arithmetic.

3. All of the texts placed a great deal of emphasis on the concepts of numeration.

4. In accounting for concepts of fundamental operations with whole numbers, the writer noted that all of the texts dealt with addition and subtraction, but only two showed "some evidence" of multiplication and division.

5. All of the texts showed "some evidence" of common fractions, but showed "no clear evidence" of decimals.

6. With respect to concepts of measurement, the texts were strikingly varied in extent of provisions. However, all of the texts treated some aspects of measurement.

7. Games and play were used in all of the books to enliven the subject of arithmetic.

8. All of the texts made an attempt to use simple language and sentence structure and to deal adequately with each new topic, so that children can thoroughly understand one process before undertaking to learn the next.

9. It was concluded that the authors and publishers appeared to have been in agreement as to what should or should not be included in the first grade arithmetic textbooks.

Implication

The findings and conclusions of this research suggest the following implication:

> That the authors of the six selected textbooks tend to organize the materials of books around the accepted criteria of the subject-matter area, although they operate within differing frames of reference.

Recommendations

The findings, conclusions and implication which stemmed from this study would appear to warrant the following recommendations:

1. That the critical examination and evaluation of the competing series of textbook under consideration should be guided by carefully formulated statements setting forth the factors of quality expected in this field, and that due consideration should be given to the use of the score card.

2. That teachers should become knowledgeable about the suggested principles and concepts which are adopted in Volume I of Mathematics for Georgia Schools.

3. That teachers and other professional personnel who may select and evaluate arithmetic textbooks for the first grade consider these five texts listed below because of the "excellent" ratings received in this study. The texts are: Modern Arithmetic Through Discovery, One by One, Mathematics We Need, Sets. Numbers Numerals, and Meeting Mathematics.

APPENDIX

BOOK LIST

The following list includes six arithmetic textbooks approved by the State of Georgia for the first grade level at the time of this research. They are as follow:

	Publisher and Location	Book
1.	Silver Burdett Company Atlanta	Modern Arithmetic Through Discovery Robert Lee Morton, Merle Gray and Myron F. Rosskopf, 1966
2.	Harcourt, Brace and World, Inc., New York	One by One Caroline H. Clark, et al. 1966
3.	Ginn and Company Boston	Mathematics We Need William A. Brownell and J. Fred Weaver, 1965
4.	Scott, Foresman and Company, Chicago	Seeing Through Arithmetic Maurice L. Haetung, et al. 1964
5.	Laidlaw Brothers Publishers, River Forest	Sets . Numbers Numerals Bernard H. Gundlach, Ronald C. Welch and Edward G. Buffie, 1965
6.	American Book Company Atlanta	Meeting Mathematics Edwina Deans, Robert B. Kane and Robert A. Oesterle

SCORE CARD FOR USE IN SELECTING FIRST GRADE ARITHMETIC TEXTBOOK

Directions: Rate each item from 4-0, with "4" representing the highest rank. The relative quality of special features within the arithmetic textbook is indicated according to this code:

"4" means "Meets the criteria in excess of those of the State guide"
"3" means "Present at an excellent level"
"2" means "Present to a great extent"
"1" means "Present to some extent"
"0" means "No clear evidence"

Name of book_____

Author's name_____

Publisher's name_____

Copyright date_____

Physical Characteristics	Rating				
	4	3	2	1	0
1. Is the cover of the book attractive?					
2. Is the print easy to read?					
3. Is the type size adapted to grade level?					
4. Is there a statement of philosophy?					
5. Are the pictures, charts, directions and other guides attractive and well placed?					
6. Are the illustrations an integral part of the teaching program?					
7. Is the presentation of new material clear and understandable?					
8. Are diagnostic tests provided for specific weaknesses?					
9. Is there a helpful manual provided for the teacher?					

Subject Matter Content	Rating 4	3	2	1	0
A. Numeration					
1. Reading and writing to 99					
2. Ordinals through tenth					
3. Sets (Groups) to 10 and members of a set					
4. One to one matching					
5. Vocabulary extended to understanding of more than, greaterthan, less than, and others.					
6. Place-value of ones, tens					
7. Distinguishing between even and odd numbers					
B. Fundamental Operations With Whole Numbers					
1. Combine and separate groups through ten					
2. Use number line for adding and subtracting					
3. Understand the commutative proberty of addition					
4. Understand the symbols +, -, and =					
5. Understand that multiplication means putting together groups of equal size					
6. Understand that division means separating a whole group					
C. Fundamental Operations With Fractions					
1. Common fractions					
2. Decimals in money					
D. Measurement					
1. Linear Use inch, foot, and yard					
2. Liquid Use cup, pint and quart					

3. Weight
   Use pound
4. Time
   Understand hour and half hour, days of week
   Months and seasons of year
5. Money
   coins
6. Quantity
   Pair, dozen, ½ dozen and tablespoon
7. Temperature
   Thermometer

E. Geometry

1. Square
2. Triangle
3. Rectangle
4. Line
5. Circle

F. Problem Solving

1. Through oral expression formulate creative story problems
2. Solve oral and written problems involving the mathematical operations

Sequential Development	Rating 4	3	2	1	0
1. Does the text provide for a systematic review of the work of preceding year?					
2. Does the text provide for correlation of the various branches of arithmetic					
3. Does the text provide for simultaneously teaching of arithmetic?					
4. Are the elements of increasing complexity introduced in spiral fashions?					

Types of Activities	Rating				
	4	3	2	1	0
1. Activities to build readiness					
2. Activities for individual reteaching					
3. Activities suggested to precede lesson					
4. Real life activities					
5. Variety to insure interests					
6. Provisions for measuring progress in oral and written expressions					
7. Activities for remedial instructional materials					
8. Enrichment materials provided for rapid learners					
9. Format provides for motivation					

TABLE 1A

DISTRIBUTION OF QUANTITATIVE RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE PHYSICAL CHARACTERISTICS

Physical Characteristics	Modern Arithmetic Through Discovery		One by One		Mathematics We Need		Seeing Through Arithmetic		Sets . Numbers Numerals		Meeting Mathematics	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Is the cover of the book attractive?	X		X		X			X	X		X	
Is the print easy to read?	X		X		X		X		X		X	
Is the type size adapted to grade level?	X		X		X		X		X		X	
Are the pages designed for ease of teaching?	X		X		X		X		X		X	
Are the pictures attractive?	X		X		X		X		X		X	
Are the illustrations suitable to the grade level?	X		X		X		X		X		X	

Directions: Place an "X" in the column opposite each of the items in order to indicate the presence or absence of a given feature within the arithmetic textbook.

TABLE 2A

DISTRIBUTION OF QUANTITATIVE RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE CONCEPTS OF NUMERATION

Numeration	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets. Numbers Numerals	Meeting Mathematics
Reading and writing to 99	47	63	24	34	44	42
Ordinals through tenth	0	7	2	4	1	10
Sets	46	55	64	24	22	48
One to one matching	4	3	6	9	9	12
Understand more than, greater than, and others	3	13	10	17	5	12
Place-value	0	14	6	5	3	8
Even and odd numbers	1	11	1	0	0	1
Total	101	156	113	93	84	133

TABLE 3A

DISTRIBUTION OF QUANTITATIVE RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO BASIC CONCEPTS OF FUNDAMENTAL OPERATIONS WITH WHOLE NUMBERS

Fundamental Operations With Whole Numbers	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets. Numbers Numerals	Meeting Mathematics
Combine and separate groups through ten	53	39	71	39	50	47
Understand the symbols (+, =, -)	3	5	0	12	0	2
Use number line for adding and subtracting	3	14	4	0	4	0
Understand that multiplication means putting together groups of equal size	0	3	0	0	0	12
Division means separating a whole group	0	3	0	0	0	12
Total	59	64	75	51	54	73

TABLE 4A

DISTRIBUTION OF QUANTITATIVE RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE BASIC CONCEPTS OF FUNDAMENTALS OPERATIONS WITH NUMBERS

Textbooks	Common Fractions	Decimals
Modern Arithmetic Through Discovery	6	0
One by One	8	0
Mathematics We Need	0	0
Seeing Through Arithmetic	0	0
Sets. Numbers Numerals	5	0
Meeting Mathematics	2	0
Total	21	0

TABLE 5A

DISTRIBUTION OF QUANTITATIVE RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE CONCEPTS OF MEASUREMENT

Measurement	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets. Numbers Numerals	Meeting Mathematics
Linear (inch, foot, yard)	5	10	2	4	4	3
Liquid(cup, pint and quart)	3	3	2	4	1	3
Weight (pound)	0	0	2	0	0	1
Time (hour, half hour, days of week, months and seasons)	3	8	3	0	3	3
Money (coins)	6	19	6	12	4	10
Quantity (pair, dozen, tablespoon)	0	0	0	0	0	0
Temperature	0	0	2	0	0	1
Total	17	40	17	20	12	21

TABLE 6A

DISTRIBUTION OF QUANTITATIVE RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE CONCEPTS OF GEOMETRY

Geometry	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets. Numbers Numerals	Meeting Mathematics
1. Square	6	7	6	7	9	0
2. Triangle	5	4	6	7	4	0
3. Rectangle	6	5	6	7	3	0
4. Line	6	7	3	11	10	0
5. Circle	5	3	6	5	8	0
Total	28	26	27	37	34	0

TABLE 7A

DISTRIBUTION OF QUANTITATIVE RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE CONCEPTS OF PROBLEM SOLVING

Problem Solving	Modern Arithmetic Through Discovery	One by One	Mathematics We Need	Seeing Through Arithmetic	Sets. Numbers Numerals	Meeting Mathematics
Through oral expression formulate creative story problems	26	20	17	33	10	21
Solve oral and written problems involving the mathematical operations	29	25	17	33	12	24
Total	55	45	34	66	22	45

TABLE 8A

DISTRIBUTION OF RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE SEQUENTIAL DEVELOPMENT

Sequential Development	Modern Arithmetic Through Discovery		One by One		Mathematics We Need		Seeing Through Arithmetic		Sets. Numbers Numerals		Meeting Mathematics	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Does the text provide for a systematic review?	X		X		X		X		X		X	
Does the text provide for correlation of the various branches of arithmetic?	X		X		X		X		X		X	
Does the text provide for simultaneously teaching of arithmetic?	X		X		X		X		X		X	
Are the elements of increasing complexity introduced in spiral fashions?	X		X		X		X		X		X	

TABLE 9A

DISTRIBUTION OF QUANTITATIVE RATINGS OF THE ARITHMETIC TEXTBOOKS ACCORDING TO THE TYPES OF ACTIVITIES

Types of Activities	Modern Arithmetic Through Discovery		One by One		Mathematics We Need		Seeing Through Arithmetic		Sets. Numbers Numerals		Meeting Mathematics	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
To build readiness	X		X		X		X		X		X	
For individual reteaching	X		X			X	X		X		X	
To precede lesson	X		X		X		X		X		X	
Real activities	X		X		X		X		X		X	
Variety to insure interests	X		X		X		X		X		X	
Provisions for measuring progress in oral and written expressions	X		X		X		X		X		X	
Activities for remedial instructional materials	X		X		X		X		X		X	
Enrichment materials for rapid learners	X		X		X		X		X		X	

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